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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,879	09/29/2003	Gerald Harron	85195-202 ADB	5367

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EXAMINER	
ODOM, CURTIS B	
ART UNIT	**PAPER NUMBER**
2611	

DATE MAILED: 10/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/671,879	HARRON ET AL.	
	Examiner	Art Unit	
	Curtis B. Odom	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because the axis of each graph is suggested to be labeled (see Figs 3-5 and 8-10). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 2-4, 6, 7, 10-12, 16, and 18 objected to because of the following informalities:

a. In claim 2, line 15, "the power" is suggested to be changed to "the peak power".

b. In claim 3, line 17, "the time delay" is suggested to be changed to "a time delay". In claim 3, line 18, "the power requirement" is suggested to be changed to "the peak power requirement".

c. In claim 4, line 20, "the time delay is suggested to be changed to "a time delay". In claim 4, line 21, "the power requirement" is suggested to be changed to "the peak power requirement".

d. In claim 6, line 4,"the baseband" is suggested to be changed to "a baseband signal".

e. In claim 7, line 6, "the modulated signals" is suggested to be changed to "the amplitude modulated signals".

f. In claim 10, line 11, "at symbol rate" is suggested to be changed to "at a symbol rate."

g. In claim 11, line 14, "at higher than symbol rate" is suggested to be changed to "at a rate higher than a symbol rate".

h. In claim 12, line 16, "at lower than symbol rate" is suggested to be changed to "at a lower rate than a symbol rate".

i. In claim 16, line 6, "analogue FET control" is suggested to be changed to "analog Field Effect Transistor (FET) control".

j. In claim 18, line 11, "the modulating signal level" is suggested to be changed to "a modulating signal level".

k. In claim 18, line 12, "the dynamic compression adjustment" is suggested to be changed to "a dynamic compression adjustment".

l. In claim 18, line 16, "the RF amplifier" is suggested to be changed to "a radio frequency (RF) amplifier."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation "A method of generating a quadrature amplitude modulation signal". However, claim 1 fails to recite when or how the quadrature amplitude modulation signals are generated. Thus, claims 1-19 are indefinite because they fail to define when or how the quadrature amplitude modulated and generated.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 5, 7-12, 16, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rofougaran et al. (U. S. Patent No. 7, 082, 293) in view of Evans (U. S. Patent No. 6, 556, 629).

Regarding claim 1, Rofougaran et al. discloses a method of generating QAM signals (see Fig. 2, block 12 and column 7, lines 47-57) comprising:

creating a composite amplitude modulated signal (see Fig. 2) using two carriers (I and Q) of the same local oscillator frequency (see column 11, lines 46-49) wherein the two carriers are distinguished by having a phase difference (shift) of 90 degrees with respect to the qudrature (Q) carrier (see column 34, lines 63-67); and

amplifying the signal in a power amplifier (Fig. 2, block 62, column 11, lines 49-52) for transmission, the power amplifier having an input port (see Fig. 2, control port) for adjustment of a bias (compression) value of the power amplifier (as described in column 31, lines 30-46), wherein it is the understanding of the examiner that controlling a bias of the amplifiers controls the compression value of the amplifier (see instant specification, page 6, lines 15-16).

However, Rofougaran et al. does not disclose repeatedly generating a signal indicative of a peak power requirement of the signal; and using the peak power requirement to dynamically adjust the power amplifier compression (bias) to match the requirements of the instantaneous symbol power.

However, Evans et al. discloses a modulator/transmitter (see Fig. 1) including a power amplifier (see Fig. 1, block 12), wherein a power supply controller (see Fig. 1, block 122)

repeatedly generates a signal indicative of a measured peak power requirement of the signal (see Abstract) and wherein also the peak power requirement is used to dynamically adjust the power amplifier bias (compression) to match the requirements of the each instantaneous output symbol power (see Abstract). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method of Rofougaran et al. with adjustment of the power amplifier as disclosed by Evans et al. since Evans et al. states adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 5, Evans further discloses the signal generated by the power supply controller which is indicative of the peak power requirement is generated by monitoring the peak envelope power of symbols (see Abstract). It would have been obvious to include this feature since Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 7, Evans et al. further discloses the signal generated by the power supply controller which is indicative of the peak power requirement is generated by monitoring modulated signals (see column 2, lines 59-65 and column 3, lines 23-27). It would have been obvious to include this feature since Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 8, Evans further discloses the power amplifier bias is adjusted every output symbol step (see Abstract). It would have been obvious to include this feature since

Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 9, Evans further discloses the power amplifier bias is adjusted gradually for the peak envelope power (of multiple symbols), see Abstract. It would have been obvious to include this feature since Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 10, Evans et al. further discloses the power amplifier bias is adjusted at a symbol rate (once per symbol), see column 3, lines 55-57. It would have been obvious to include this feature since Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 11, Evans discloses the power amplifier bias is adjusted at 10x the symbol rate (see column 3, lines 49-54), wherein the bias is adjusted by the power supply controller for the 10 peaks of the symbol. It would have been obvious to include this feature since Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 12, Evans discloses the power amplifier voltage is adjusted at a rate lower than the symbol rate for the peak envelope power (of multiple symbols), see Abstract. It would have been obvious to include this feature since Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 16, Evans et al. further discloses the power amplifier bias is controlled by controlling a base bias current supply by analog FET control (see column 3, lines 28-35). It would have been obvious to include this feature since Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 17, Evans further discloses the signal is a multi-channel (carrier) signal, wherein the symbol power is based on the sum (average) of the individual carriers (see column 2, line 59-column 3, line 7). It would have been obvious to include this feature since Evans et al. discloses adjusting the bias voltage of the power amplifier improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

Regarding claim 19, Evans further discloses the bias control of the amplifier exceeds the normal average power to provide high (crest) peak power (see column 2, lines 20-27 and column 3, lines 32-35) that would normally not be possible without damage to the amplifier (as described in column 1, lines 41-49).

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rofougaran et al. (U. S. Patent No. 7, 082, 293) in view of Evans (U. S. Patent No. 6, 556, 629) as applied to claim 1, and in further view of Leizerovich et al. (U. S. Patent No. 5, 880, 633).

Regarding claim 2, Rofougaran et al. and Evans do not disclose a time delay to ensure the power amplifier compression is adjusted when the peak power is required.

However, Leizerovich et al. discloses adjusting a power amplifier bias (see Fig. 1, block 6) in a data signal path using a dynamic bias circuit (see Fig. 1, block 61, and column 4, lines 10-16). Leizerovich et al. further discloses introducing a delay through the dynamic bias circuit

signal path and the data signal path (see Fig. 1, blocks 66a and 66b) to improve the operation of the dynamic bias circuit (see column 4, lines 25-29). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to introduce delays between the amplifier control path and the data signal path of Rofougaran et al. and Evans as disclosed by Leizerovich et al. since Leizerovich et al. states these delays improve the operation of the amplifier controller by equalizing the difference in the signal paths (which ensures the bias is adjusted when required), see Leizerovich et al., column 4, lines 25-29.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rofougaran et al. (U. S. Patent No. 7, 082, 293) in view of Evans (U. S. Patent No. 6, 556, 629) as applied to claim 1, and in further view of Toumani et al. (U. S. Patent No. 6, 987, 851).

Regarding claim 3, Evans discloses increasing the bias voltage (power) of the power amplifier (see Abstract). Rofougaran et al. and Evans do not disclose a time delay is arranged to adjust the bias at an advanced time before the increase power requirement.

However, Toumani et al. discloses adjusting a bias of a power amplifier using a control signal, wherein there is a delay applied to the data signal so that the control signal is generated and applied in advance to the delivery of the data signal to the power amplifier (see column 2, lines 26-36 and column 3, lines 57-63). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method of Rofougaran et al. and Evans with the delay as taught by Toumani et al. since Toumani et al. states the delay avoids clipping and minimizes power consumption by varying the amplifier's voltages to conform with the signal peaks of the signal (see column 3, lines 62-66).

9. Claims 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rofougaran et al. (U. S. Patent No. 7, 082, 293) in view of Evans (U. S. Patent No. 6, 556, 629) as applied to claim 1, and in further view of Petsko (U. S. Patent No. 6, 535, 066).

Regarding claim 4, Evans discloses decreasing the bias voltage (power) of the power amplifier (see Abstract). Rofougaran et al. and Evans do not disclose a time delay is arranged to adjust the bias at a delayed time after the decrease power requirement.

However, Petsko discloses controlling an amplifier bias (see column 2, lines 26-33) by means of a control signal, wherein the control signal is delayed so that it is not received by the power amplifier until the correct symbol is present (see column 4, lines 50-54). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method of Rofougaran et al. and Evans with the delay of Petsko in order to apply the correct bias to the correct symbol since Petsko states the average operating point of the amplifier is reduced by adaptive bias control on a symbol-by-symbol basis (see column 3, lines 53-55).

Regarding claim 13, Rofougaran et al. and Evans do not disclose a look up table in a memory for determining the power amplifier bias from the peak power requirement. However, Petsko discloses controlling an amplifier bias (see column 2, lines 26-33) by means of a control signal, wherein the control signal is delayed so that it is not received by the power amplifier until the correct symbol is present (see column 4, lines 50-54). The bias control signal is generated by measuring a peak requirement of a symbol (see column 4, lines 30-34) and selecting a bias control signal based on the peak measurement from a lookup table (see column 4, lines 35-39 and 50-54). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method of Rofougaran et al. and Evans with the peak power

based look-up table of Petsko since Petsko states the look-up table is simple and easily implemented when only the peak power is the variable used in the look-up table (see column 4, lines 35-39).

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rofougaran et al. (U. S. Patent No. 7, 082, 293) in view of Evans (U. S. Patent No. 6, 556, 629) as applied to claim 1, and in further view of Minowa (U. S. Patent No. 7, 103, 029).

Regarding claim 6, Rofougaran et al. and Evans do not disclose the signal indicative of a peak power requirement is generated by monitoring baseband signals.

However, Evans et al. discloses a power supply controller (see Fig. 1, block 122) repeatedly generates a signal indicative of a measured peak power requirement of the signal (see Abstract) and wherein also the peak power requirement is used to dynamically adjust the power amplifier bias (compression) to match the requirements of the each instantaneous output symbol power (see Abstract). Minowa further discloses monitoring and detecting of the peak power can be performed on a transmission baseband signal (see column 14, lines 49-53). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method of Rofougaran et al. and Evans to detect a peak power from a baseband signal as disclosed by Minowa since Evans states adjusting the bias voltage of the power amplifier based on a peak power of the signal improves the DC to RF power conversion efficiency of the transmitter (see column 2, lines 43-49).

11. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rofougaran et al. (U. S. Patent No. 7, 082, 293) in view of Evans (U. S. Patent No. 6, 556, 629) as applied to claim 1, and in further view Vail et al. (U. S. Patent No. 6, 646, 600).

Regarding claims 14 and 15, Evans discloses the power amplifier bias is controlled by controlling a base bias current supply base on controlling a voltage of the amplifier (see column 3, lines 28-35). However, Rofougaran et al. and Evans do not disclose power amplifier bias is controlled by a digital signal or the power amplifier bias is controlled by a digitally selecting one or more from a plurality of resistances for controlling a current supply to the power amplifier.

However, Vail et al. discloses controlling the bias of an amplifier by providing digital bias control signals to a resistor network to provide a programmable bias voltage to the amplifier (see column4, line 66-column 5, line 13). Vail et al. further discloses resistor network can include programmable resistors (see column 2, lines 4-9), wherein the resistor network is designed to provide a specific voltage based on the digital bias adjust signals (see column 5, lines 25-37). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method of Rofougaran et al. and Evans with digital controls signals which control resistances to adjust an amplifier bias as disclosed by Vail et al. since Vail et al. states this method of controlling the amplifier bias is an inexpensive capability (see column 6, lines 3-5).

12. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rofougaran et al. (U. S. Patent No. 7, 082, 293) in view of Evans (U. S. Patent No. 6, 556, 629) as applied to claim 1, and in further view of Mitzlaff (US 2003/0107434).

Regarding claim 18, Rofougaran et al. and Evans do not disclose a pre-distortion compensation of a modulating signal level to correct for any small gain changes occurring with bias adjustment.

However, Mitzlaff discloses an apparatus (see Fig. 3) including an amplifier bias controller (see Fig. 3, block 304) to control the bias of a power amplifier (see Fig. 3, block 360, section 0029), wherein the apparatus also includes a predistortion compensation which cancels distortion components introduced by the variations (which includes gain distortions) in the amplifier bias control signal (see section 0032). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method of Rofougaran et al. and Evans with the predistortion of Mitzlaff since Mitzlaff states the predistortion removes distortion components from the amplified signal, thus, allowing the amplifier to output a signal without gain or phase distortions (see section 0032).

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Curtis Odom
October 28, 2006